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## AN EXPERIMENTAL STUDY OF 'FEELINGS OF RELATION'<sup>1</sup>

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### PART I

#### *The Problem*

The aim of our investigation has been to determine whether there are to be found, in the experience of the average individual, either elements or patterns of consciousness which may be peculiarly distinguished as feelings of relation. There is no doubt that what one learns of the connections between objects forms a large and significant part of one's fund of knowledge. And the capacity to make the relational response, to reply *night* to the examiner's *day*, or *quadruped* to his *horse*, is a fairly well established test of normality. But our interest lies in knowing whether the meanings of relation and the relational behavior have or may have as their conscious counterpart feelings of relation, simple or complex.

#### *The Observers*

Our method of procedure, in the rough, would be to choose as observers individuals whose intellectual activities were of

<sup>1</sup> From the Psychological Laboratory of Cornell University.

at least the average complexity and scope; and who furthermore were, by virtue of psychological interest and training, qualified to report on the contents of their experiences. Such observers we should place in an environment which would stimulate in them, not the mere relational response of the *opposites* test or the rule-of-three, but full realization and pregnant awareness of a relational situation.

The seven men and women whose services as observers were engaged for the greater part of the investigation, and who in the following reports will be designated as Be, Bi, C, F, H, K, and Y, were college graduates. With the exception of C, an advanced student in Philosophy, they were, in the course of their graduate research in the Psychological Laboratory, acquiring more or less skill in introspection. Since their attainments in this respect varied, however, we may well note that it is common experience in working with the imperfectly trained observer to find him erring on the side of superfluity of report, unless, of course, a systematic bias inclines him in the other direction. It is more than likely that he has not rid himself of the superstition that content-processes are highly correlated with personality, that an introspective report must do justice to the richness and distinction of his own experience; nothing that pertains to him is irrelevant. And the properly impersonal observer, as the literature of the thought-processes liberally shows, may long work under the conviction that any analysis of a portion of consciousness should be adequate logically to explain the accompanying meaning.

We should expect to find these tendencies occasionally among the observers of our group. This means, at least, that the danger of their overlooking any conscious correlates of their meanings of relation would be no greater than with more practised individuals. We were safe in assuming, on the other hand, that our observers had no prejudices of a systematic order to offset these tendencies; the one man who evinced an interest in the problem was unquestionably objective in his attitude.

At the close of our research we checked our findings with these student-observers by a short series of experiments in which two members of the Psychological Faculty, introspectors of years' standing, took part.

### *The Method*

We began our experimentation by using a reaction method. The Hipp chronoscope with the accessory apparatus was in circuit with a simple tachistoscope and a lip-key. At the first of the two usual signals the observer closed the key. The con-

tact was made when the shutter was raised to expose the stimulus: a card upon which were depicted the two terms of a relation. The exposure lasted until the observer indicated, by releasing his key and thereby breaking the circuit, that he was aware of the relation. A reaction-setting, however, unless the observers are especially trained in such an application of it, emphasizes for them the temporal aspect of the response sufficiently to interfere with the leisurely experience which we wished to induce. For the majority of our subjects we found that it put a premium upon a rapid and perhaps superficial verbal response. So we dispensed with the time-taking. The cards were exposed after the usual signals. The observer reported *yes* or *now* when he became aware of a relation, and the shutter was dropped.

*Experimentation and Results: (1) With Graphic Stimuli*

Our first stimuli were pairs of geometrical figures and of pictures of simple objects, in various qualitative, quantitative and spatial relations.

Our instructions were fractionated, in order to give the observer opportunity to become familiar with the relational awareness before he was asked for a psychological analysis. "You will be shown a card on which are pictured two or more objects in relation. Receive these stimuli passively and let them in every case impress a relation upon you; do not try yourself to read a relation into them. React as soon as any relation shows itself. You will be asked for a full statement of this relation and of the mental activity that preceded and led up to it." The instructions to observe and report the content-processes differed only in the closing sentence: "You will be asked for a full introspective report of the processes accompanying the relation, with as complete a report of the processes of the fore-period as you can give."

Such instructions surely would not facilitate a mere verbal response: the observer is not encouraged, for instance, in the pre-formulation of a relation into which the stimuli may be thrown; the stimuli, rather, are to impress their relation upon him.

But our reports will show that these stimuli of our first choice, in spite of the instructions, were not at all of the sort to induce a peculiar relational attitude and experience, even if we were to find it frequently occurring under other conditions. When the observer followed instructions, the relational meanings of difference, similarity, spatial opposition came immediately and automatically, as part of the visual perception. However rich the mental setting in which mankind

may first have found the meanings of these simple relations, it would seem that for us they come unattended by experiences which are to be distinguished structurally, or even marked off temporally, from the rest of consciousness. Messer found that the understanding of a stimulus (in the particular case, a word) may come immediately with the sensory impression and may be fused with it in an unanalyzable experience.<sup>2</sup> The reports of our observers allow us to add that the relational meanings may be part of this immediate understanding. "I saw that they were circles," reported Bi, "and then the difference in size came. I don't know how it came, it was so obvious;" and K's similar report was: "I immediately saw that the figures were similar in outline and at the same time different in size. That was all."

Our interpretation of these reports, as we have indicated, is that the meaning of the relation accrues to the visual impression and is comparable with the other meanings (thing, figure, object) so accruing. In the way of conscious correlate there is nothing peculiar to the relation; there is, indeed, nothing but the visual impression which it shares with the other meanings, with now and then the kinaesthesia of the verbal-motor response. The observer can not follow our instructions to react to a relational awareness, because there is no such awareness. What he can do with these stimuli, and what he did do when he made such reports as those we have given, was to recognize the meanings of difference and symmetry and superposition as relational meanings, and to react to them as such. In the same way, under different instructions, he would identify his meanings of circle and line as geometrical. He was classifying meanings, not conscious processes and attitudes. His distinction was that of objects and the connections between them, not that of sensory and imaginal perceptions, let us say, and feelings of relation.

We trust these individuals as observers. We think that if there had been anything further in the way of conscious content they would have noted it. But our conclusions as to the basis of their classification do not rest upon the bareness of their reports alone. In the majority of the experiments with these early stimuli the procedure was not the simple one described. To reflect upon one's meanings as they come, to analyse and to give them generic names, is not the usual attitude. One does not normally say: "Here I perceive a line, and here a second line; and now comes the mean-

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<sup>2</sup> A. Messer, *Experimentell-psychologische Untersuchungen über das Denken*, in Arch. f. d. ges. Psych., viii., 1906, 71 f.

ing of the relation of parallelism existing between these lines." No: one sees two parallel lines; and in so doing one may overlook the fact that one is having a relational meaning. This happened with our observers, set though they were to report relations.

K: "First I saw two black parallel lines; I realized that they were arrows when my eye was caught by the notches, and I saw that they went in different directions. Then I reacted to the fact that they were both arrows. The relation was not easy to find."

The relation was not easy to find, when she had already noted the parallelism and the difference in direction! Surely if there had been peculiar conscious counterparts, feelings of relations, they would have marked those meanings as relations.

With the relations coming unheeded, our observers were hard pressed to make any response to the instructions. They could not react to awarenesses of relations, because, as we have said, there were no awarenesses. They could not react to meanings, because these were not identified as relations. So they began, notwithstanding our instructions, to read relations into the stimuli.

K: "Saw parallel lines on black. Then I decided to see whether they were equal in length; they were, so I reacted."

Y: "Saw a white field with geometrical figures, and I was aware of a difference between them. I stared at them. Then thought, 'Well, there are two of them,' and reacted." And again this observer reported: "The relation is togetherness. There was a white field with black lines. I saw that the lines were different in length. Then I felt the strain of finding a relation, stared at it. Then in verbal motor 'togetherness,' and I reacted. After the reaction, came the realization that the difference in length may have been the first relation. And I'm not sure that *togetherness* is a relation."

This uncertainty which Y expresses is clearly with respect to a classification of meanings. "Difference" is a relation of good standing; "togetherness" is not one of the usual terms of logic.

Later this observer made explicit his criterion for relations. Not only did he and the others fail to recognize relational meanings as such; on the other hand, they reacted to meanings which were not relational. Of these a frequent one was that of the logical universe. On such an occasion Y reported, "White field, green-brown extents, verbal motor 'trees.' The meaning came that they were different in size. Then verbal-motor 'trees' again; and I reacted. It seems as I look back that there were relations to which I didn't react because I didn't cognize them as relations at the time." Then shortly he continued: "I've been trying

to define what a relation is. I recalled Marvin's statement, 'A relation implies at least two terms.' In that case of 'trees' it was the single meaning of trees to which I reacted. That wasn't a relation, I suppose." He told us here what his reports and those of the others had already shown; that the reactions were not made in response either to realizing awarenesses of relations or, on the other hand, to feelings of relation or conscious attitudes.

We shall say then that in these early experiments with the simple graphic stimuli our observers were not vividly aware of their relations. But a meaning of relation may occur, it seems, without bringing the realizing awareness of it. So our observers substituted for the task we had set them, of reacting to the awareness of relations, that of the reaction to these meanings. But in their determinations of what meanings were relational they could not be guided by anything in their present conscious experience; they must rely upon logical or pre-logical distinctions. Here they were not sure of their ground. They were, most of them, unfamiliar with the definitions of logic and as yet they had not formulated their own. And still another factor contributed to the difficulty of the situation: the understanding of the simple figures with their relations was so immediate, so automatic and so unitary a process that the relational meanings frequently did not offer themselves even for reflection.

Until we had made our experimental conditions undeniably favorable for the full awareness of the relations, we must of course postpone judgment as to the frequency of that experience. But even these first observations had established one fact beyond dispute: a situation may have a relational meaning for an individual, and it may furthermore stimulate in him by way of response an adequate statement of relation, while at the same time he is experiencing nothing more in consciousness than the perceptive impression, and perhaps the kinaesthesia attending his bodily adjustment to the stimulus and his verbal response.

## (2) *With Verbal Stimuli*

Our immediate problem, we thought, must be to find stimuli in which the relations would be less obvious. This time we showed the observers cards upon which were printed words representing the terms of a relation. Our pairs were widely chosen: *Jesse-David*; *baseball-cricket*; *alchemy-chemistry*; *nebula-solar system*. It was characteristic of them all, however, that the relations were unequivocal; the observers would not be forced to devise relations.

The accompanying instructions were again fractionated: "You will be shown two words which represent the terms of a relation. Receive these stimuli passively and let them in every case impress a relation upon you; do not try yourself to read a relation into them. Indicate (by 'yes' or similar sign) when you are aware of a relation. I shall ask you to state this relation and to show how its meaning developed." The differential close for the instructions to introspect ran: "I shall ask you for a full introspective report of the psychological processes which you could observe during your awareness of the relation."

There was, however, no change in the observers' responses or in their attitudes. The reaction to the meaning of the logical universe, with the barest of experiences on the psychological side, was still frequent. Y's report is typical: "The relationship [between Edward VII and George V] is 'Kings of England.' I read the words visually and then 'Here are two kings' came in verbal-motor imagery. I reacted to the meaning 'Kings of England.'" "Weber and Fechner are psychologists;" "Petal and corolla are botanical terms," we were told. The obvious way to eliminate this form of response was to name the universe of discourse as the stimuli were given. Into our instructions we inserted the clause: "Before the exposure I shall name to you the universe of discourse in which this relation lies." Mere statements of the universe came, as we had anticipated, less frequently. But we had hoped further that, with the universe given, the observers, relieved of making that first orientation, would be free to experience the relations fully and vividly. This more significant effect was not realized. What happened was rather that some of the observers found their task much more difficult when the statement of the universe was inhibited. With many of the stimuli that response was the only one forthcoming. "You have taken away my thunder," complained K. And it was quite apparent from their reports that she and at least one other observer were taking the experiment as an information test, rather than waiting passively for the relational awareness to come. When these two observers were not sure of the connection between the terms, they made guesses; and their guesses ranged from half-truths to outright mistakes; "Henry James is an Englishman;" "Ulster is trying for Home-rule;" "King's College and Columbia are juxtaposed." So we decided to make it possible for them to meet all of the requirements of the instructions without any statement of a relation. "If no relation shows itself, signify that in the same way," we told them. And to assure them of our good faith



in this we gave occasional pairs of stimuli with which guessing would lead to an absurdity; Sheraton might, to be sure, be called the discoverer of Uranus or even a fellow planet; but no one, we thought, would give Praxiteles a place on Mr. Hoover's commission.

Now it is clear that what Bi and K had done when they guessed, and what the others had undoubtedly done when they gave bare statements of the logical universe, was to respond merely to that section of the instructions which told them that they would be asked to state the relation. They had not responded to the stimuli by becoming fully aware of them. And it was not strange, since they were trying merely to state a relation, that they chose the easiest way of doing so. But now we had made the formal requirements of our instructions extremely simple. The observers were to signify that they had become aware of a relation, or they were to signify that they had not done so. To do the task set them no statement of relation was necessary. But our instructions did strongly suggest to them that the stimuli would induce in them an awareness of relation. Without the experimental hour we discussed with them the difference between simply knowing about a relation and realizing that relation. Later we made an addition to our instructions and a further readjustment of them. We asked our observers to make the awareness of the relation the focal part of their experience. And because the fractionated instructions tended to emphasize the mere verbal response, of naming and explicating the relation, sufficiently to offset the advantage of any opportunity which such a device offered for fuller and more unhindered awarenesses, we combined in one set the instructions to name the relation and show its development, and on the other hand to describe the psychological processes.

Our experiments with the simple figures and our first reformulations of instructions took place during the second and third weeks of October. The six individuals who had shared in these experiments continued to observe until the middle of January, when our work took on a different aspect. With the exception of C, who came twice a week, they gave three hours a week to the experiment.

During this time, four of our observers, Be, Bi, F and K, never experienced awareness of relations or on the other hand feelings of relations or conscious attitudes. They had meanings of relations, of course, and they made adequate relational responses. But not only did they report nothing of the nature of relational elements comparable to the sensation and the

image, or conscious attitudes or patterns to be distinguished as relational: they did not even report realizing awarenesses. We shall consider the reports of these observers and the inferences to be drawn from them before turning to those of our other observers.

Of this group, F gave reports which seem to us especially significant. We have in her a student of high standing in college and university and an observer whose efforts in behalf of the experiment may be highly commended. When the logical universe was given with the stimuli, and the response of naming it was accordingly inhibited, there was a large number of stimuli for which F did not state a relation. "If you had not told me the universe I could have said that," she commented after one of her failures to report a relation. So we should say that frequently the only response which F made to the stimuli was the orienting one of naming the universe. Then she adopted a verbal formula into which the terms were thrown; and the psychological experience for her consisted in nothing more than the actual or imaginal statement of the formula. In its barest form it was like this: when the stimulus words were *right-left* F reported "'Right to left' is the relation. I read the words and said to myself 'right is to left.'" Usually, however, the meaning of the terms was more limited. "The Socialist party is broader than the Republican. The relation is 'broadness is to narrowness.' I just said to myself 'broad is to narrow.'" Sometimes a verbal-motor association intervened as with the stimuli *cricket-baseball*; "English is to American. First I said 'Brown of Rugby' and then the relation came at once."

We read the instructions aloud to her and explained that what we especially desired was not the formal statement but the full and realizing awareness of the relation. From that time her responses and the corresponding conscious experiences fell, for the greater number, into four groups. There was the bare verbal response which came immediately and which was accompanied in consciousness by the verbal kinaesthesia, as when upon seeing *Germany-England* F responded "opposed." Or again, the relational meaning might attach itself directly to the meanings of the stimulus-words. "The relation [between prune and plum] is one of difference in surface. The prune is rough, the plum is smooth. Had dark blue visual images." This is nearly as simple as seeing that two lines are different in length, and involves no more in the way of relational awareness. The third type is represented in the following: "I just thought (and said to myself) 'The larva is a small grublike thing in the first stage of life of the moth; later there is a stage where the chrysalis, a cocoon-like thing, is formed in which the animal sleeps preparatory to becoming a moth or a butterfly. Then after these definitions, I got the relation; this represents the growing up of a butterfly. It is a genetic relation.'" It is all as if one were reciting one's zoology lesson. It is a response to the class-room situation rather than an awareness of the genetic relation.

The first and third types differ only in complexity and in the fact that the third is a delayed response. They are essentially responses to the instructions, and were barren on the conscious side. The second is more passive, rather of the nature of a chance association. The fourth type differs from the first and third as being another form of response. If two objects are known to us, not through the class-room or newspapers, but from our own handling of them (or from our

acquaintance with their use), our most natural response to them is not the mere verbal response, but rather the bodily movements involved in the use of them. Thus when we gave as stimulus-words *needle-thread*, F reported: "There was clear visual and tactual imagery; a needle was in my left hand, a thread in my right. The thread went through the needle. The relation is 'the thread pulling along through the needle.'" That is to say, the relation is the physical connection of the two objects represented. If the objects were less familiar or less tractable, F's response was again purely verbal-motor, usually taking the form of the functional definition: "The commutator reverses the electric current;" or "The hinge is the thing that lets the door swing to and fro."

Obviously, in all of these instances, there is nothing in her experience which F designates as an awareness of relation, there is nothing on the psychological side which we are to characterize peculiarly as relational. For her the relation is a meaning, or it is a mode of behavior in keeping with which she makes her response.

Be's reports offer nothing further in the way of relational awareness or psychological process. Here again we found the barest of verbal responses: *Virgil-Aeneid* brought nothing but the verbal-motor imagery, "Virgil's Aeneid." And here too was the mere comprehension of the stimuli involving the relational meaning. The defining response appeared in both its aspects; the functional with words like *damper-string*, and the class-room type as in the statement "*Winckelmann* is a student of Greek art." We had, by the way, chosen the field of Greek art particularly because Be had taken extensive undergraduate work in it. The fullest experiences which she reported were of a memorial nature. With *Arthur-Excalibur*, she reported: "'The passing of Arthur' came in verbal-motor. I had a visual image which meant the knight's return to tell Arthur that the sword had been thrown into the lake. Then I saw the rest; the hand came up and Arthur was carried away. Finally I thought that the sword was Arthur's. The relation was ownership." Here the relation appears to be a reflective response to the instructions; Be gives no evidence of a realizing awareness of it.

For K and Bi the relation is fairly consistently a mode of response to instructions. When the statement of the universe was inhibited, they still gave it in the guise of what they called the relation of identity. Between Dante and Virgil K gave this relation and explicated it as identity of function. "The meaning of poet followed directly upon reading Virgil; said 'identity' to myself." This superficial response is obviously a function rather of the instructions to state a relation than of the stimulus-words. There is no living awareness of the relation between Dante and Virgil. The other responses of K were definitions, sometimes with elaborative imagery, or handling of the terms. To *straight line-cylinder* she said: "The straight line is an element of the cylinder. The relation is generation. There was a visual image of the cylinder, and the line revolving about the circle was represented by eye movements." The response is, of course, quite adequate to the question 'What is the relation?' With *tangent-secant*, however, K had a fuller experience, and broke away from the mere answer to question: "I had a visual image of a circle with a tangent and a secant. Then I thought that relative to the circle they are the same except that the two points of the contact of the tangent are the same, while those of the secant are not. This was represented by verbalization and by the kinaesthesia of drawing it all out in my lap. Then with another visual image and

with further drawing I realized that one is the limiting position of the other. It was the relation of identity." This report is ambiguous: K says that she "realizes" the relation, but on the other hand there is no evidence of this realization and there is nothing on the psychological side but the usual associative imagery and the kinaesthesia of the drawing response. So one is inclined to regard her verb merely as an accidental turn of speech, and to classify the experience with the other instances where relational meanings have accrued to the situation. Still there is possible the interpretation of it as a fleeting awareness.

Bi never broke away from the attitude of response to instructions. Besides making the response of 'identity,' he used a formula somewhat like F's: "The relation of Latin to English," "The relation of the container to the contained." But his most frequent response was that of the definition. Sometimes this was a rather long process of remembering and formulation. The stimulus-words were *primary coil—secondary coil*; Bi reported "There was a strain in my head and in my throat, and then there was a relaxation which meant 'I've got the relation.' I remembered the passage in Titchener's *Manual* and started to formulate: 'The primary coil receives the current at a certain voltage and amperage; when it comes out of the secondary the voltage is increased tremendously and the amperage decreased proportionately.'" In the persistence of the *Aufgabe*-awareness we have, of course, further indication that Bi persisted in taking the experiment as a reaction.

This attitude is typical of all of Bi's reports. Usually, however, the response was much simpler: "Coke comes from coal," "The pole star lies out in space on a line with the Great Dipper;" and on the psychological side he reported the usual verbal imagery, the strain and relaxation of the task, and the occasional fragmentary visual or auditory imagery. With the names of familiar, portable objects, again, we get primarily, instead of the verbal response, the other appropriate movements. Bi welcomes these stimuli as producing vivid and real experiences. But as with his fellow observers, the "vivid and real" experience is not an awareness of relation but the imaged response. Such reports as the following leave little doubt as to this. "This was a vivid experience," he reported on *ball-cue*. "There was strong kinaesthesia, first the strain of holding the cue, then I actually poked the ball. After that in verbal-motor came my statement of the relation 'A cue is what you push the ball with.'"

Before closing our work with these four observers we returned to graphic stimuli. It might be, we thought, that stimuli in the form of words were a cue for the purely verbal response. In this new series of figures, however, the relation was not so apparent as in the first, and in a number of instances several relations were possible. Typical pairs are two Gaussian curves with different measures of precision; a circle and an ellipse; St. George's and St. Andrew's crosses (which could also be taken as arithmetical signs); an escapement wheel and its lock; a Zeppelin and a Montgolfier balloon. Our instructions differed only in the necessary details.

The reports were of the same type. There was the appropriate and adequate response: "The relation is similarity of mathematical functions; the one is a repeated function of the other. This was in auditory verbal imagery." Bi had his customary tension and relaxation with the verbal kinaesthesia of the response. For F, while the stimuli might result in a mild empathy, the relation was the formal superficial re-

sponse: "With the first my head was upright; with the second it felt twisted to the left. Straight is to oblique."

In four of our observers, then, we have individuals for whom the relational situation may have the proper meaning, and from whom it may call forth an appropriate response. We needed no experimental data to convince us of this: their college and university records give ample proof. But when placed in an experimental environment especially designed to induce in them full realization and pregnant awareness of its relational aspect, they gave no evidence of such an experience; and whatever might be the psychological correlates of a relational awareness, we had found, corresponding to the relational behavior and the meanings of behavior, merely the kinaesthetic patterns of the response, and the imagery of the associative consciousness: there was neither element nor pattern to be peculiarly designated as a feeling of relation.

Of our other observers, C unfortunately has had little training in introspection, and we are scarcely justified in drawing final inferences from her reports. She indicated several times in the course of her observations that she had not been able to describe adequately the experiences induced by the stimuli, but in what she gave we find nothing more in the way of awareness or of psychological content than the first four observers reported. When practicable objects were named she, too, observed only the imagery of the appropriate movements. On the other hand she never gave the bare definitions so frequent with the others; the stimuli always brought associated meanings: "I first remembered that Lessing mentions Winckelmann in the *Laocoön*. I tried to remember his attitude. Winckelmann, I know, through his work on Greek art, originated modern German aesthetics." It is impossible, because of the lack of introspection, to say conclusively that this is a case merely of associated meanings. And the same thing is true of the next: "The relation [between Dante and Virgil] has a double aspect: it's a parental relation and the literary relation of master and disciple. First I had a visual image of Corot's picture of Virgil and Dante in the underworld, Virgil leading Dante, protecting and fatherly. I thought of Virgil as Dante's guide and mentor."

Of Y and H, however, more is to be said. Y, it is true, in the course of the three months gave many reports which are of quite the same nature as those we have considered. Sometimes he reported the barest of verbal experiences: *Great Britain-Crown Colony* stimulated the response "tributary to;" and *Copernican-Ptolemaic* gave "followed," with nothing to

be observed on the psychological side but the visual perception and throat kinaesthesia. Occasionally he took as the relation a memorial experience in which the two terms appeared: "I recalled the recent meeting of Labor at which Gompers introduced Wilson. I took this as the relation. There was the visual reading and fragmentary black and white imagery of a newspaper column."

But with *Armada-England* Y reported: "There came simply the feeling that they are related. It's a conscious attitude of knowing that they go together. After that I got in verbal-motor imagery 'Spanish;' and a visual image of the map of England." Now, here is something different in nature from a motor response, verbal or otherwise, to a situation, on the one hand, and an associated relational meaning on the other. Indeed, the full meaning does not come; but Y is aware of a relatedness. But what are the psychological counterparts of this awareness? As it occurred from time to time Y analyzed it as the conscious attitude of familiarity; or again it simply meant the logical universe, and was attended by faint tags of verbal imagery. Once he reported: "At first there was no relation, then suddenly it came, just the feeling that they are related; it's a sort of warmth." Here then we have an elementary awareness of relation; which proves to be psychologically no peculiarly relational content, but a well-known conscious attitude, verbal imagery, and a "sort of warmth;" and it is significant, furthermore, that H, in his reports, did not call these experiences awarenesses of relation: "It's simply a logical meaning; it's as if 'Why they belong together, they're related.' Sometimes it's not to be separated from the first perception; when it is, it may be attended by the feeling of familiarity."

Y's "awareness of relation" was not always so simple, however. The words *nebula-solar system* induced in him his fullest experience. "Immediately, even before I verbalized the words, came the awareness that they are definitely related in a particular way. Then I was aware of the way: The solar system evolves from a nebula; this came with the idea of rotary motion and mass formation. The relation is one of evolutionary development. Afterwards I recalled that the nebular theory is given up. But this was quite apart from the relation. That sudden awareness and the development of the meaning were a continuous process." He characterized it further when he contrasted with it another experience. "This relation is true, of course, but it's washed out and superficial. It was forced on the terms instead of rising from them spontaneously. It lacked the solidity and warmth of the

nebula-solar system awareness. That was real awareness."

Yes, it was a "real awareness," a durative consciousness of a definite inception followed by predetermined associations which culminated in the full meaning. Here, if anywhere, we should expect to find feelings of relation. But Y observed on the psychological side "just vaguely localized organics, a sort of warmth, and some visual imagery." In this vivid experience there was no relational element; the contents that were present did not even fall into patterns which could be characterized as relational. And Y's account of his awareness of relation on the meaningful side reads like those of the way in which Laura Bridgman and Helen Keller learned to associate names with objects. It is the story of any vivid awareness.

It is further significant that Y likewise designated as a "good, live awareness" the widely spread bodily imagery which he experienced in common with the other observers when the stimuli were such as to induce that response. With *magnetic field-electric current* he reported: "Immediately there was full kinaesthetic imagery of turning to the left and going forward, with my right hand high above my head and my left pointing to the ground. This gave me the relation of the direction of the current to that of the magnetic field." Even when taken in the large, there is no distinction for Y between an experience which may be called full realization and awareness of a relational situation, and one which, in strictness, is merely a satisfyingly adequate bodily response.

H also had his "awarenesses of relation," and they formed the bulk of his experiences. Unlike Y, he had a definite criterion for them. The mere knowing that two objects belonged together did not, as we have seen, constitute a "relational awareness." H's characterization of the experience was: "You can state the relation and you may get visual or other imagery, but you don't *feel* the relation until the organics come." With *Weber-Fechner* he reported: "I knew that they were related; there was a little throat strain. Then came visual imagery; scrappy, indistinct bits of tables and formulae flitting through." But this he emphatically tells us is not essential to the relational awareness; that appears only with the kinaesthetic imagery and organic pressures. These are not the vaguely localized warmths of Y's analysis, but fairly elaborate and illustrative of a particular relational meaning—as visual imagery is illustrative. "Somewhere in my chest there were organics of light pressure, globular things; then they pulled out into a line. With that I realized the relation of succession, one following the other."

Contrasted with these relational awarenesses are the experiences in which there is mere association of relational meanings; "The first relation was: 'John baptized Jesus.' Then the relation of 'preceding,' purely logical in verbal-motor with a little visual imagery. I recalled the *Brook Kerith*. But in all this I experienced nothing of a relation."

H's experiences are thus richer and more vivid than those of most of our observers. He does indeed realize the relations, but his "awareness of relation" is rather an organic dramatization of the particular meaning than an arrangement of the meanings, such as Y offered.

There were, then, three ways in which our seven observers were stimulated when the terms of relations were named or depicted for them. 1. They all, at times, some more frequently than others, made what seemed to them the proper relational response: this may be verbal,—the name of the logical universe, a single phrase denoting the relation, or a mere elaborate formulation of it; or it may take the form of other bodily attitudes which represent the customary behavior with the objects represented. And the psychological correlate is the corresponding kinaesthetic impression or imagery, this attended, in some cases, by the familiar strain and relaxation which form the pattern of the *Aufgabe*-awareness. 2. In the second group we have the more passive experiences in which certain of the meanings which accrued to the stimuli were relational, or were so considered by our observers. On the psychological side, there were observed only the usual processes of the associative consciousness. In neither of these two experiences was there any full realization or pregnant awareness of the relation as such; and among the existential processes and the psychological complexes there was none to be characterized as peculiarly relational. 3. Only two of our observers made explicit report of "awarenesses of relation." H's awarenesses, which were the more frequent, we have seen to consist merely in a full organic accompaniment of the relational meaning. Psychologically, they too are not to be distinguished as to element or pattern. Among Y's awarenesses there were the knowledge that the objects belonged to a particular universe, and the feeling of familiarity to which H did not give the term 'relation.' In its fullest development, Y's awareness of relation, taken in the large, showed an arrangement of meanings common to all awarenesses or to all experiences in which the end is predetermined by an *Aufgabe*. It, too, offered to analysis nothing but vague kinaesthesia and the usual imagery.



Notwithstanding our confidence in these observers we were glad to check their reports by those of members of the staff, for we had not in the least anticipated that, in the situation which our instructions and stimuli made, vivid awarenesses of relation would not be often induced. With W and D, however, the purely verbal response was quite as frequent. "Read the words [*Weber-Fechner*]; 'both psychologists' came verbally, then I said 'similar;'" or "The relation [between tide and moon] is cause and effect; auditory-verbal imagery only." And there was approximately the same proportion of associative experiences: "Read the words: 'image-sensation;'" almost immediately came a visual image meaning the lecture room below, and I saw myself lecturing at the desk. Then the word 'identity' came. Between the visual image and the word I had the notion of the debate about the two terms."

For W the experience usually began with a feeling of familiarity and comfortableness (or the opposite), one of Y's awarenesses. What he himself termed an awareness of relation consisted, he said, merely in knowing how to use the terms; and, as the correlated processes, he reported verbal-motor images of words and phrases. These were not always expressive of a relation; in some cases no relational meaning came.

D's attitude was, with the exception of two or three associative experiences, that of making the adequate response. And like Bi, he reported the usual kinaesthesia of the *Aufgabe*-awareness. With him, however, this was exceptionally vivid. The proper verbal response comes and D observes "a very pleasant feeling, a glow and the imaginal kinaesthesia of nodding 'yes, yes!'" It is significant for our problem that D gave to this experience, which is unmistakably the satisfaction in having done the task, the name of "relational awareness."

### *Conclusions*

Our problem has been to learn whether there are to be found in the experiences of individuals, selected for their high academic, and (with a single exception) for their psychological training, elements or patterns of consciousness which are to be peculiarly distinguished as feelings of relation. The results of our experiment are unequivocal. 1. Our experimental situation, in which stimuli and instructions were especially designed with the intention of inducing in the observer a full realization and pregnant awareness of the relation, seldom had this effect. Our observers could not, in the majority of cases, follow our instructions to react to the awareness of relation, because no awareness came: they made

relational responses and they stated the relational meanings which were associated with the perception of the stimuli. In other instances the feeling of familiarity, knowing the logical universe, the imagery of the full bodily response to the stimuli, the relaxation and pleasantness of the *Aufgabe*-awareness, and finally an organic depicting of the particular relational meaning, were all called awarenesses of relation. The other experience, which was so named, resembled in its general form any awareness or durative consciousness the course of which is predetermined. 2. In all of our experiments, with nine observers, a relational element was not once observed. The existential processes are the usual imagery, the kinaesthesia attending bodily movement, and organic pressures and warmth. 3. We have, furthermore, found, corresponding to the relational behavior or the relational meaning, or even to the full awareness of relation, no pattern of the contents of consciousness which may be designated as a relational complex. In this respect we may not speak of the relational consciousness in the sense in which we speak of the generalizing, or the recognitive or the emotional consciousness.

## PART II.

### HISTORY OF THE PROBLEM

Our conclusions as to the nature of the relational experience are not in accord with the views held by many psychologists. Calkins,<sup>3</sup> Titchener<sup>4</sup> and Washburn<sup>5</sup> have listed the supporters of the relational element. Our intention in the following pages will be to offer explanations for this diversity of view in the instances of several representative writers. In every case our discussion must, for lack of space, be limited to a brief statement of the theory and to our own conclusions. References to the author's full treatment will, however, always be given.

In his chapter on the *Composition of Mind*, Herbert Spencer classifies the components of mind as "the Feelings and the Relations between feelings."<sup>6</sup> This distinction, as Spencer first draws it, has both an introspective and a logical basis. In contrast to the feelings, a relation between feelings does not occupy an appreciable part of consciousness; and if the terms which it unites are taken away, "it disappears along with them; having no independent place—no individuality of its own." But he proceeds straightway to say that these cannot be grounds for an absolute distinction: "Under an ultimate analysis, what we call a relation proves to be itself a kind of feeling—the momentary feeling accompanying the transition from one conspicuous feeling to another conspicuous feeling. And it is true that, notwithstanding its extreme brevity, its qualitative character is appre-

<sup>3</sup> M. W. Calkins, *A First Book in Psychology*, 1912, 362ff.

<sup>4</sup> E. B. Titchener, *Lectures on the Experimental Psychology of the Thought Processes*, 1909, 301ff.

<sup>5</sup> M. F. Washburn, *Movement and Mental Imagery*, 1916, 187ff.

<sup>6</sup> H. Spencer, *Principles of Psychology*, 1880, I, 163ff

ciable; for relations are distinguishable from one another only by the unlikeness of the feelings which accompany the momentary transitions." The introspective distinction is gone. As for that of logical dependence, Spencer continues, "We must also admit that just as a relation can have no existence apart from the feelings which form its terms, so a feeling can exist only by relations to other feelings which limit it in space or time or both. Strictly speaking, neither a feeling nor a relation is an independent element of consciousness."

The original distinction is, however, to be maintained, not for psychological reasons but because it is deducible from Spencer's theories of physiological and anatomical correlations. A consideration of musical sound, it will be remembered, had led Spencer to infer that all feelings are composed of units of feeling, or shocks, which are the subjective equivalents of waves of molecular change propagated through a nerve center. "When a rapid succession of such waves yields a rapid succession of such units of feeling, there results the continuous feeling known as a sensation."<sup>7</sup> The relational feeling, on the other hand, Spencer regards as a single one of these nervous shocks.<sup>8</sup> On the anatomical side, "feelings and the relations between feelings correspond to nerve-corpuscles and the fibres which connect nerve-corpuscles; or rather, to the molecular changes transmitted through fibres."<sup>9</sup> Hence, "whereas a relational feeling is a portion of consciousness inseparable into parts, a feeling ordinarily so-called, is a portion of consciousness that admits imaginary division into like parts which are related to one another in sequence or co-existence. A feeling proper is an aggregate of related like parts, while a relational feeling is undecomposable."<sup>10</sup> But to introspection they are both undecomposable, both simple constituents of mind.

If on the other hand the feelings and relations are regarded subjectively, we have states in consciousness and we have changes between these states. But "the changes are themselves cognizable as states of consciousness; not, indeed, as simple states, but as states in which the transitions from state to state are the things contemplated." And these "changes in consciousness are nothing else than what we call relations."<sup>11</sup>

Spencer's relational feeling, then, is not a function of the scientific method of observation; it is derived deductively from a system of neuro-physiology and aestho-physiology. And when, thus derived, it is viewed subjectively, it is characterized and classified epistemologically, on the basis of the objects of "contemplation." Evidently, a relational element thus conceived is not on the level of scientific psychology; and it is therefore difficult to understand how a modern psychologist can make Spencer lead the list of the supporters of the relational element. Not Spencer's introspection, but his system, "speaks unequivocally in favor of the occurrence of a relational element."<sup>12</sup>

Schrader's discussion of the conscious relation<sup>13</sup> offers a second line of reasoning, which is based on the assumption that there is a term-

<sup>7</sup> *Ibid.*, 184.

<sup>8</sup> *Ibid.*, 164.

<sup>9</sup> *Ibid.*, 190.

<sup>10</sup> *Ibid.*, 163ff.

<sup>11</sup> *Ibid.*, II, 263ff.

<sup>12</sup> Calkins, *op. cit.*, 363.

<sup>13</sup> E. Schrader, *Die bewusste Beziehung zwischen Vorstellungen als konstitutives Bewusstseinsmoment: ein Beitrag zur Psychologie der Denkerscheinungen*, 1893.

for-term, logically adequate, correlation between meanings on the one hand and psychological processes on the other. Because this argument appears in present-day briefs for the relational element, often as a makeshift for observation in professedly experimental studies, it is worth while to review Schrader's work which places it properly on a pre-scientific level. Schrader's starting-point is in such everyday experiences as this: while walking he sees a figure which he takes to be that of a woman in a gray dress; but later he observes that this individual is pushing a wheel-barrow, and he perceives not a woman but a workman wearing a gray apron.<sup>14</sup> The problem is to explain how, in such an experience, the resulting idea of man, (*a*), has come from the initial idea of woman, (*b*), by way of the idea of wheel-barrow, (*c*). The four laws of association are inadequate for this purpose. Schrader's solution is the hypothesis that a relation exists between (*a*) and (*b*) and results in (*c*). This relation is a psychological process, and although the evidence is not conclusive, Schrader chooses to regard it as a conscious one: it is unthinkable that two conscious ideas should act upon each other unconsciously.<sup>15</sup> If observation does not reveal such a process, the logical conclusion is that observation is not the only method for investigating the phenomena of consciousness: the relation is an assumption essential to the desired explanation.

It would seem unnecessary to point out that such a discussion can have no significance for experimental psychology. Schrader's elements, his "ideas," are not psychological processes but meanings: it is these meanings for the explanation of which the Aristotelian laws are insufficient and the conscious relation is necessary. Moreover Schrader's problem is itself not psychological: psychology is not interested in the rationalizing of thought. His method is not observation but deduction; his criteria are not empirical but logical. And his result is an hypothesis, a postulate of explanation; this he himself says, and reiterates the statement in a later work.<sup>16</sup> Yet we shall find experimentalists claiming for the relation a place among psychological elements on such grounds as these.

What, however, is to be our answer to James' plea for the "rein-statement of the vague to its proper place in our mental life?" Here we are not concerned with a philosophical system, or with an explanation of the course of our thinking; James' primary appeal is rather to his individual experience. "There is not a conjunction or a preposition, and hardly an adverbial phrase, syntactic form, or inflection of voice, in human speech, that does not express some shading or other of relation which we at some moment actually feel to exist between the larger objects of our thought. If we speak objectively, it is the real relations that appear revealed; if we speak subjectively, it is the stream of consciousness that matches each of them by an inward coloring of its own. In either case the relations are numberless, and no existing language is capable of doing justice to all their shades.

"We ought to say a feeling of *and*, a feeling of *if*, a feeling of *but*, and a feeling of *by*, quite as readily as we say a feeling of *blue* or a feeling of *cold*."<sup>17</sup>

It may well be that we have here evidence of a richness of experience which is not the possession of the majority, of such experience as our own educated observers do not reveal in their reports. But

<sup>14</sup> *Ibid.*, 8ff.

<sup>15</sup> *Ibid.*, 36ff.

<sup>16</sup> *Elemente der Psychologie des Urteils*, 1905.

<sup>17</sup> James, *The Principles of Psychology*, 1890, I, 245f.

be that as it may, James is certainly not regarding these feelings psychologically. His elements, it will be remembered, his sensations and perceptions, are cognitive functions; hence we read of a feeling of *if*, and a feeling of *cold*, and are told that the one is a transitive part, the other a substantive part, of the stream of thought. But we have still to ask what these feelings of *if* and of *but* are, in strictly psychological terms. Titchener's answer is this: "All such 'feelings'—feelings of *if* and *why*, and nevertheless, and therefore—normally take the form, in my experience, of motor empathy. I act the feeling out, though as a rule in imaginal and not in sensational terms. It may be fleeting, or it may be relatively stable; whatever it is, I have not the slightest doubt of its kinaesthetic character."<sup>18</sup> And he quotes Rowland's summary of that part of her experiment in which the observers were asked to describe the psychological experiences associated with prepositions: "All the different prepositions can be expressed by some variety of 'huddle,' and indeed that is the only way they can be expressed and have any significance."<sup>19</sup>

Washburn, too, making a more theoretical approach to the problem in *Movement and Imagery*, reduces the feelings of relation to kinaesthetic sensations. In 1906 she had pointed out a kinaesthetic origin for them in "remotely ancestral motor attitudes."<sup>20</sup> In her recent discussion of the 'imageless processes'<sup>21</sup> she takes as her starting point the fact that certain of them, including the feelings of relation, can be named: "some of them are clearly designated by being called 'likeness,' 'the feeling of but,' . . . and so forth." But naming is a motor response, and Washburn reasons that "if two processes (in our terminology, two movement systems) are associated with the same motor response, the great probability is that they are so associated by virtue of being essentially alike. . . . It would therefore seem probable that if we promptly and unhesitatingly use the word 'but' when two conscious processes are in a relation of opposition, no matter what the nature of the processes thus related may be, whether they are two colors or two theories of the universe, the butness is due to a nervous process essentially the same in both cases." And the same inference may be drawn for all cases of "'ifness,' likeness, difference, 'greaterness,' 'lessness,'" and the rest. The question then is: what is the character of these "common factors?" And Washburn, as we have said, chooses to consider them kinaesthetic. In the first place, there is no other kind of sensation that is so regularly an accompaniment of other modalities as is the kinaesthetic. Further, the popular claim that the processes are non-sensational may be readily explained by several conditions that make analysis difficult. And there is, beyond these arguments, the evidence afforded by such introspections as Titchener's in the instances of the motor attitudes which show a "tendency to develop and diffuse themselves until they produce in consciousness analyzable organic attitudes."

Calkins' relational elements are, like James', based upon an appeal to experience.<sup>22</sup> "When, for example, I try to match one green with another, my consciousness of greenness, of colorless light, of bright-

<sup>18</sup> Titchener, *op. cit.*, 185.

<sup>19</sup> E. Rowland, *The Psychological Experiences connected with the Different Parts of Speech*, 1907, 24.

<sup>20</sup> M. F. Washburn, *The Term 'Feeling,' Journ. Philos. Psych. Sci. Meth.*, III, 1906, 620.

<sup>21</sup> *Movement and Mental Imagery*, 1916, 195ff.

<sup>22</sup> Calkins, *op. cit.*, 138ff.

ness and of extensity are not the only elements of my consciousness. On the contrary, the consciousness of the likeness or difference of the given green as compared with the standard is the very essence of the experience." But consciousness of green and consciousness of likeness are meanings; and there is no apparent reason for thinking that, when viewed psychologically, this experience would not be describable in the terms to which our observers reduced their experiences of the same meanings. In a following account the writer tends to abstract from the individual meaning of the experience and to logicize it: "The recognition of a picture, that is, the consciousness of it as familiar, is the realization of the sameness of my present with my past experience of it. This includes not the mere sensational imagination of the word 'same' but the obviously relational consciousness of sameness." To call familiarity the realization of sameness is to remove one's assignment of values a step from the immediate experience, and we should hardly expect to find a psychological description at this level.

Again, when Calkins passes from reporting her meaningful experiences to a systematic discussion, her criteria are not psychological but logical. "The relational element is reflectively known as, so to speak, belonging to, attached to, another element or constituent of the complex experience of the given moment. And the relational is distinguished from the attributive element as belonging to at least two such other elements or factors. . . . We are conscious of the likeness or unlikeness of one color or pleasure or relation to another—that is, the relational consciousness is, as it were, subordinated to two other elemental experiences."<sup>23</sup>

In the experimental sphere, Woodworth's investigation<sup>24</sup> is one of the few frontal attacks upon the relational experience; but his claim for an unanalyzable relational content was not supported when the rule-of-three experiments were repeated in the Cornell Laboratory.<sup>25</sup> By far the greater number of the conclusions as to the nature of the experience are by-products of investigations focussed upon other problems, such as Messer's<sup>26</sup> and Ach's<sup>27</sup> researches. Both of these men include the relational experience among the 'conscious attitudes.' As the Cornell study already referred to shows that "conscious attitudes can be analyzed into sensations and images and feelings, or traced genetically to such analyzable complexes,"<sup>28</sup> we need not consider this position further.

Bühler, however, after copious researches in the Würzburg Laboratory on the process of thought, ranks the relation among the mental elements. We may then look to his work to show us what the experimental basis for this frequent view of the relation can be. It is to be noted, by the way, that Bühler opens his first study, *Ueber Gedanken*, with a review of recent discussion as to the correspondence between the logical and the psychological laws of thought.<sup>29</sup> This is an unfortunate background for a scientific investigation: it may lead to the

<sup>23</sup> *Ibid.*, 331.

<sup>24</sup> R. S. Woodworth, *The Consciousness of Relation*, in *Essays Philosophical and Psychological in Honour of William James*, 1908, 495ff.

<sup>25</sup> H. M. Clarke, *Amer. Journ. Psych.*, XXII, 1911, 243ff.

<sup>26</sup> A. Messer, *Experimentell-psychologische Untersuchungen über das Denken*, in *Arch. f. d. ges. Psych.*, VIII, 1906.

<sup>27</sup> N. Ach, *Ueber d. Willenstätigkeit u. d. Denken*, 1905.

<sup>28</sup> Clarke, *op. cit.*, 246.

<sup>29</sup> K. Bühler, *Ueber Gedanken*, in *Arch. f. d. ges. Psych.*, IX, 1907, 299ff.

same non-psychological rationalizing of mental elements that we found in Schrader's work.

But Bühler's results may speak for themselves. His problem, broadly stated, is: what do we experience when we think, when we solve given problems? His method is to ask his observers questions of various types, all of which will evoke effort on their part, and to get from them full reports of their experiences. With this material his first specific question is: what are the components (*Bestandstücke*) of our thought experiences? And it will be remembered that he finds, in his observer's reports, other than sensory processes and feelings and conscious attitudes, "etwas, was vor allem keine sinnliche Qualität, keine sinnliche Intensität aufweist; etwas, von dem man wohl einen Klarheitsgrad, einen Sicherheitsgrad, eine Lebhaftigkeit, mit der es das psychische Interesse in Anspruch nimmt, aussagen kann, das aber inhaltlich ganz anders bestimmt ist als alles, was sich letzten Endes auf Empfindungen zurückführen lässt."<sup>30</sup> The observers, in referring to such experiences as this, most frequently and most fittingly use the term *Gedanken*; and it is this term which Bühler adopts.

So far Bühler's problem has been psychological: an analysis of an extent of consciousness (we shall later examine his solution of it). He now asks: what are the *essential* components, what are the vehicles of the thought content? There is of course a psychological possibility in this question: we may take it to refer to a strict empirical correlation. But that is not Bühler's intention; he is already in Hüsserl's plane: "was ist das psychisch-reale Correlat des Ideellen, das die Logik bestimmt?"<sup>31</sup> And his first reply is, as we should fear, on the same level. The necessary element is the *Gedanke*: "Es genügt ein Blick auf die Protokolle, um sagen zu können: etwas, was so fragmentarisch, so sporadisch, so durchaus zufällig auftritt im Bewusstsein wie die Vorstellungen in unseren Denkerlebnissen, kann nicht als Träger des festgefügt und kontinuierlichen Denkgehalts angesehen werden."<sup>32</sup> But is there any reason for thinking that we shall find between thoughts and psychological processes such a correlation as a logician would design? No such argument *a priori* can be acceptable to psychologists. So let us turn to the reports themselves, to see whether there is to be found in them evidence for the existence of such elements as the *Gedanken*. After all, Bühler presents himself as approaching the problem not with the method of the logician but with introspection. Here is a typical report from the Würzburg observers: ". . . Es kam mir der Gedanke: durch Gedanken ans Zukünftige werden die Menschen bestimmt. Dann aber gleich der Gedanke: dass der Gedanke an das Zukünftige nicht mit der Zukunft selbst verwechselt werden darf, dass solche . . . Verweschlungen aber einen häufigen Trick im philosophischen Denken bilden. (Von Worten oder Vorstellungen war bei alledem keine Spur.) . . ."<sup>33</sup> But if, as the observer says, there is no trace of a perceptual basis, neither is there much that is psychological. Such reports our Cornell observers made when instructed to state meanings: "I thought that relative to the circle the tangent and the secant are the same, except that the two points of contact of the tangent are the same, while those of the secant are not." The *Gedanken*, as the Würzburg observers report them, are no more to be taken as mental elements than is this 'thought'

<sup>30</sup> *Ibid.*, 315.

<sup>31</sup> *Ibid.*, 316.

<sup>32</sup> *Ibid.*, 317.

<sup>33</sup> *Ibid.*, 318.

of K's. They are meanings, and they are characterized only as meanings: the *Gedanke* that the thought of the future should not be confused with the future itself; the *Gedanken* of causality, altruism and so forth. Moreover, besides this evidence from the reports themselves, we have the statement of one of the two observers upon whom Bühler most relied that his own reports were to a great extent not introspective.<sup>34</sup>

This, then, is our definition of Bühler's position: his observers report meanings under the head of *Gedanken*; he, with his non-psychological desire for a logically adequate parallelism between mental elements and meanings or *Gedankengehalt*, takes as the psychological vehicle of the meanings the meanings themselves. This is the status of the *Gedanken* in general, and of the relation as a particular *Gedanke*.

But, taking the Würzburg reports for the statements of meaning which they for the greater part are, we may still ask whether they give evidence of experiences essentially different from those which our observers reported and, when introspecting, analyzed into sensory and imaginal processes. In case they do so, we must of course suspend judgment as to the psychological correlates until proper observations have been made.

Bühler distinguishes several types of *Gedanken*.<sup>35</sup> First there is the *Regelbewusstsein*, consciousness of rule or principle; "I knew how one solves such questions," or "I was conscious that one can get the meaning of this concept." These are clearly meanings, and Bühler characterizes them in their purely epistemological aspects: "The object of the *Regelbewusstsein* is not the rule but the objective to which it is applicable." Our aim was not the study of the problem-solving consciousness, so our relevant data are not abundant; but this *Gedanke* is comparable, we think, to the "knowing how to use a term" which our observer W reported, and which he described psychologically as "verbal-motor imagery of words and phrases."

Secondly, Bühler has the *Beziehungsbewusstsein*, consciousness of relation. He discusses the relations more fully in a later section; but at this point there is especially to be noted Bühler's unfortunate tendency to over-interpret reports. The relations may be so obvious, he says, that the observer fails to mention them; he thinks that he has given them when he gives the terms. An observer, for instance, reports that he "thought of monism and dualism;" of course he means, says Bühler, "the opposition of monism and dualism." But there is no justification for such an interpretation, especially in the light of what our Cornell results reveal as to the superficiality of quite adequate thinking. So some of Bühler's relations do not represent even the meaningful side of his observers' experience, but are the product of his own logical bias. When the Würzburg observers do report relations, their statements read like those made by our observers when asked for meanings: "I was conscious of relation between whole and part;" "the opposition between thoughts and bodily limitations." These experiences appear to be, not pregnant relational awarenesses, but the superficial relational meanings so frequent in our own results; and there is no reason to think that a psychological treatment of them would disclose other psychological processes than those observed by us.

Finally, there is Bühler's third type of *Gedanke*, the intention.

<sup>34</sup> E. Dürr, *Ueber die experimentelle Untersuchung der Denkvorgänge*, in *Zeits. f. Psych.*, xlix, 1908, 315, 323.

<sup>35</sup> Bühler, *op. cit.*, 334 ff.



The observers are often astonished by the extent of such consciousnesses: "I thought of the ancient scepticism, and a great deal was included in that. I had instantly the whole development in three periods." W's thought of the controversy about image and sensation is a parallel in the Cornell Laboratory. His introspection on that occasion and introspection in general offer plenty of evidence that richness of meaning is not necessarily correlated with richness of psychological content.

There is, then, in Bühler's first research nothing to lead us to question our conclusions as to the psychological nature of the relational experience. But this first experiment has suggested to Bühler that there is more in the thought-consciousness than the *Gedanken*; in particular, there are besides the relations between thoughts those between the experiences of having thoughts. The essential thing in the process of understanding, it is clear from the first results, is the consciousness of an earlier memory-thought which stands in a "conscious relation" to the object understood. It is the influence exerted by an earlier experience upon the present consciousness that Bühler now wishes to investigate; and for the purpose he devises four variations of Müller and Pilzecker's general memory method.<sup>36</sup> But this is Schrader's problem of explaining why any given thought comes to consciousness, and Bühler's "conscious relation" is really no more psychological than his. In most of the memory experiments, Bühler writes, the influence of the memory-contents comes to consciousness in an awareness, a conscious *Rückbeziehung*; the observer is conscious of a reference back to a preceding experience. But what are the data? An observer reports "I knew immediately that I had understood this before." Of course, if one wishes to evaluate this experience for a sort of behaviorism, one may join Bühler in calling it a conscious *Rückbeziehung*; but one will hardly then proceed to let this evaluating term stand for a conscious entity. The psychological question, as to the nature of the experience which had for the observer the meaning reported, Bühler's sixty odd pages leave untouched. In the Cornell Laboratory we asked five of our observers, F, Be, Bi, K, and Y, to serve in brief series of experiments modelled on Bühler's, with the additional provision that they were to introspect as well as to state meanings. We found that their experiences could be evaluated in Bühler's terms. The recall was, as Bühler found, an easily demarcated consciousness. In most cases we, too, could point to an *Ausgangsglied* and an *Endglied*. What distinguished them psychologically, when the recall was not merely automatic, was a greater attributive clearness or heightened intensity in the case of the first; and an accompaniment of relaxation-kinaesthesia with the second. When the awareness of recall was present, it proved to be, psychologically, kinaesthesia in some form,—often the imagery of turning to one side or the actual moving of the eyes. There was no indication of the necessity of recognizing another mental element of the nature of a conscious relation.

Bühler's conscious relation, we conclude, is to be ranked with the others we have considered. As the consciousness of relation, it is Calkins' and James' relational meaning. As the *Rückbeziehung*, it is, like Schrader's element, the function of an attempt to explain the sequence of thought.

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<sup>36</sup> Bühler, *Ueber Gedankenerinnerungen*, in *Arch. f. d. ges. Psych.*, xii., 1908, 24 ff.

In some experimental studies on logical memory published from the University of Louvain the relational element is taken for granted.<sup>37</sup> In the first of these investigations, Michotte and Ransy set themselves the task of determining the part played in the reproduction of logical material by "intellectual elements," especially by that one which they call the consciousness of relation. The *Treffer-Methode* was used. Substantives of current usage were presented in pairs to the observer, with the instruction to find the relations existing between the objects presented. In the test series following he reacted to the appearance of the missing term; and then introspected upon the period of recall. Later Michotte and Portych investigated the value for logical memory of the length of the interval between the two series. Here the observers were not asked to find relations, but their reports show that the so-called relational element is one of the most frequent intermediaries between the presentation of the stimulus-word and the appearance of the desired term.

The writers naturally emphasize the functional aspects of these intermediaries; our interest lies in what is told of their psychological nature. First, they are classified into external and internal relations; and the latter are enumerated: succession, superiority, causality. But if we should begin to list the colors as the red of danger and the white of truce, we should be saying nothing of the color experience as such; no more does such an enumeration of the relations reveal to us the nature of the relational experience. Moreover, when the observers characterize relations as more or less serious, as exact or inaccurate, they are, of course, taking them as meanings: it is meaningfully that identity is inaccurate as a relation between clock and picture.<sup>38</sup>

On most occasions, however, the relations appeared not alone but with other intermediaries,—visual images, verbal representations, muscular sensations, affective states.<sup>39</sup> Often these are to be taken as symbols of the relation, and they may at times be so closely united with the relation that they seem to contain it or be it, as when opposition is symbolized by a feeling of uneasiness. The writers find the completeness of this fusion striking. But let us suppose the relations to be, not coordinates of the representations as Michotte sees them, but the meanings of those processes. Then the imagery and the relations are the same experience regarded from different points of view. In cases where the psychology of a relation is overt, as it is likely to be when the observer is untrained to the relation in question but keenly on the watch for it, or when the relation itself is unusual, we should look for such a fusion.

Our supposition proves to hold as we continue with Michotte and Ransy's discussion. The relation is a phenomenon, they say, to be distinguished from the symbol for several reasons.<sup>40</sup> Often the symbol is not adequate to represent the relation. Now we are at the rudiments of descriptive psychology: "Meaning and mental processes are

<sup>37</sup> A. Michotte et C. Ransy, *Contribution à l'étude de la mémoire logique, Extrait des Annales de l'Institut Supérieur de Philosophie*, Louvain, 1912.

A. Michotte et Th. Portych, *La reproduction après des intervalles temporels de différentes longueurs, Extrait du tome II des Annales de l'Institut Supérieur de Philosophie*, 1913.

<sup>38</sup> Michotte et Ransy, *op. cit.*, 18.

<sup>39</sup> *Ibid.*, 30ff.

<sup>40</sup> *Ibid.*, 36ff.

not covariants. Richness and fullness of experience do not necessarily correspond with wealth of meaning."<sup>41</sup> Again, Michotte and Ransy point to the fact that a symbol is not peculiar to one relation but may represent from time to time very different relations. And again our assumption holds: "one and the same experience may have several meanings."<sup>42</sup> And the converse of this, that "one and the same meaning may attach to several experiences" is illustrated by Michotte and Ransy's statement that the symbol of the relation during the recall may differ from that of the impregnation. These considerations are, indeed, grounds for distinguishing relations from "representations;" but they are the evidence, too, that "mental processes do not intrinsically mean." When moreover we turn to the reports themselves, we find them to differ from those of our own observers only in that the latter make explicit the distinction between psychological process and meaning. In the Louvain studies, too, it is the failure on the part of experimenters and observers to make this distinction that gives us the "consciousness of relation" as an intellectual element.

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<sup>41</sup> Titchener, *A Beginner's Psychology*, 1916, 29.

<sup>42</sup> *Loc. cit.*